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A COMPARISON OF COLLEGE BACKGROUND,  
PIPELINE ASSIGNMENT, AND PERFORMANCE  
IN AVIATION TRAINING FOR BLACK STUDENT  
NAVAL AVIATORS AND WHITE STUDENT  
NAVAL AVIATORS

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PENSACOLA FLORIDA

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(6) A COMPARISON OF COLLEGE BACKGROUND, PIPELINE  
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## SUMMARY PAGE

### THE PROBLEM

This report represents the third in a series of reports analyzing minority officer accessions and attritions as related to the Naval Air Training Program. Previous reports have shown no differences in attrition rates for black students and white students in pilot training when the two groups are equated on AQT/FAR, procurement source, and class contiguity. Performance, as measured by academic and flight grades, however, was significantly lower for the black students. In this report three variables, college major, grade point average, and the college's racial composition were analyzed to determine the extent to which they could account for those performance differences. In addition, the two groups were compared by training pipelines.

### THE FINDINGS

The college majors of the black students were not significantly different from those of the matched group of white students. Black students with majors in technical, engineering, social science, and physical science had the highest aviation training completion rates, while white students with majors in technical, business administration, physical education, and engineering had the highest completion rates. Grade point average was predictive of pre-advanced academic grades for black students, but had no predictive validity for complete/attrite. The majority of black students attended predominantly white colleges. The AQT scores were significantly higher for black students who attended white colleges, but attrition rates did not differ. There were no differences in input or attrition rates when the black students and white students were compared by training pipelines.

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## INTRODUCTION

This report represents the third in a series of reports analyzing minority officer accessions and attritions as related to the Naval Air Training Program. Previous reports involved comparisons of black and of white civilian procured applicants in terms of 1) passing rates for different cutoff scores on the Academic Qualification Test (AQT) and on the Flight Aptitude Rating (FAR), 2) distribution of applicants and performance on the AQT/FAR according to test region and college major, and 3) reasons for nonselection and declination (1). In addition, comparisons were made of black students and a matched sample of white students in pilot training, using such performance measures as selection test scores, training grades, and pass/attrite (2).

A major objective of the present study was the comparison of performance in naval aviation training of black students with a matched sample of white students in pilot training during calendar years 1973-1976. Comparisons between the two races were made by college major, grade point average (GPA), pipeline assignments, and complete/attrite from the pipeline.

The black student input was further analyzed to determine if the racial background of the college attended had any relationship to the following variables:

- 1) Aviation Selection Test Scores
- 2) Grade Point Average
- 3) College Major
- 4) Training Grades
- 5) Complete/Attrite

The fourth report in this series will examine black students and a matched sample of white students in naval flight officer training, utilizing selection test scores, training grades, pass/attrite, and college background factors.

## PROCEDURE

### SUBJECTS

The sample used in this study consisted of the same students described in detail in the first report of this series (2) and shown by procurement source and year in Appendix A. In summary, they were 99 black students entering naval aviation training during CY73-CY76, and a comparison sample of 172 white

students matched for the following criteria: 1) Academic Qualification Test and Flight Aptitude Rating, 2) procurement sources, and 3) class contiguity.

#### METHOD

The black student naval aviators (SNAs) were compared with the white student naval aviators (SNAs) on the following variables: 1) college major, 2) grade point average, 3) pipeline assignments, and 4) complete/attrite from the pipeline.

Input and completion rates in naval aviation training for the black students and for the white comparison sample were examined according to twelve categories of college major; viz., 1) engineering (ENGR), 2) technical (TECH), e.g., mathematics, computer sciences, etc., 3) physical sciences (PHYS SCI), 4) music, 5) natural sciences (NAT SCI), 6) agriculture (AGR), 7) business administration (BUS AD), 8) physical education (P.E.), 9) behavioral sciences (BEHAV SCI), 10) humanities (HUM), 11) social sciences (SOC SCI), and 12) education (ED). Data were not available for all students.

Grade point averages of the total black sample and of the comparison sample of white students were compared with reference to complete/attrite rates from naval air training. Data on college grade point averages were provided by the Navy Recruiting Command, using a 4.0 grading scale. Data were not available for all students.

Differences in pipeline assignment (multi-engine, jet, helicopter) and complete/attrite rates from these pipelines for the two groups were also examined.

The black student input was further analyzed to determine whether the racial background of the college attended had any relationship to the following variables:

- 1) Aviation Selection Test Scores
- 2) Grade Point Average
- 3) Performance in Training
- 4) Complete/Attrite

Predominantly black colleges were identified from lists published by the United Negro College fund. For a detailed description of the Aviation Selection Test and training variables, see Baisden and Doll (2).

Descriptive analyses (means, standard deviations) were conducted on the groups for the Aviation Selection Test scores, training variables, complete/attrite, and college grade point averages. Differences between the means were tested for statistical significance using t-tests. In addition, chi squares were calculated when appropriate to test for statistical significance between groups.

## RESULTS AND DISCUSSION

Table I describes college major distributions for the black student group and for the matched white student group. The black students and the white students did not differ significantly in distribution of college major ( $\rho = .61$ ,  $p < .05$ ). The largest percentage of the black student naval aviators had backgrounds in social sciences (22.1%), followed by business administration (14.7%), engineering (13.7%), and behavioral science (13.7%). Likewise, these majors were the four top rankings for the white comparison group.

Table I  
N and Percent of Student Naval Aviators by  
Race and College Major  
CY73-CY76 Input

College Major	Black Students		White Students	
	N	%	N	%
ENGR	13	13.7	19	13.3
TECH	7	7.4	5	3.5
PHYS SCI	10	10.5	4	2.8
MUSIC	4	4.2	0	0.0
NAT SCI	6	6.3	6	4.2
AGR	1	1.1	1	0.7
BUS AD	14	14.7	33	23.1
P.E.	2	2.1	11	7.7
BEHAV SCI	13	13.7	12	8.4
HUM	4	4.2	7	4.9
SOC SCI	21	22.1	36	25.1
ED	0	0.0	9	6.3
TOTAL	95	100.0	143	100.0

Table II gives the results of comparing naval aviation training completion rate for the two groupings according to college major. Since many of the major field categories contain a small number of subjects, it is difficult to make any conclusive statements. There does not appear to be any strong trend. However, it does appear that the ENG, TECH, and PHYS SCI were good preparatory majors for blacks, while the first two were also good for whites. A similar finding was reported earlier (2) in comparing college major with passing of the aviation

selection tests. SOC SCI for blacks and BUS AD and P.E. for whites were also useful college majors.

**Table II**  
**Naval Aviation Training Completion Rates by**  
**Race and College Major**

College Major	Black Students		White Students	
	N	%	N	%
	Complete	Complete	Complete	Complete
ENG	8	61.5	12	63.2
TECH	5	71.4	4	80.0
PHYS SCI	6	60.0	2	50.0
MUSIC	2	50.0	0	0.0
NAT SCI	1	16.7	1	16.7
AGR	0	0.0	0	0.0
BUS AD	6	42.8	21	63.6
P.E.	0	0.0	7	63.3
BEHAV SCI	7	53.8	5	41.7
HUM	1	25.0	3	42.8
SOC SCI	13	61.9	17	47.2
ED	0	0.0	3	33.3

Table III provides the results of comparing GPA with academic grades received during Schools Command (EI Final), basic and advanced stages of training. There was a statistically significant relationship between GPA and academic grades received during Schools Command (EI Final) and basic academic training for the black students. The GPA for black students attending black colleges accounted for the significant relationship between GPA and EI Final. The GPA of the black students attending white colleges accounted for the significant relationship between GPA and Basic Academic. Among the white students, however, there was no significant relationship.

Findings presented in Table IV show no differences in college GPA between completions and attritions from naval aviation training for either the black SNA or the white SNA comparison group. Caution should be utilized in interpreting Tables III and IV because of the lack of comparability of GPA without controlling for college quality and college major.

Table V presents the number and percentage of the black students and the comparative white students assigned to training in the multi-engine, jet, and helicopter pipelines. The data are presented separately for Navy and Marine Corps students, since the latter group does not receive assignments to multi-engine aircraft. The results indicate no statistically significant differences

Table III

Correlations of College Grade Point Average with  
Academic Grades in Naval Air Training

Population	Environmental Indoctrination (EI) Final	Basic Academic	Advanced Academic
Black Students - Black College	.39* ( 26)	.34 ( 18)	.29 ( 14)
Black Students - White College	.28 ( 45)	.36* ( 32)	.36 ( 26)
Total Black Students	.28* ( 71)	.28* ( 50)	.29 ( 40)
Total White Students	.17 (105)	.19 ( 65)	.07 ( 57)

\* p < .05

Table IV

Means and Standard Deviations of Grade Point Averages  
by Completion and Attrition Categories

	White SNAs		Black SNAs	
	Complete	Attrite	Complete	Attrite
Mean	2.58	2.61	2.59	2.46
S.D.	.40	.39	.42	.38
N	57	60	40	40
	$t = .41$ (ns)		$t = 1.47$ (ns)	



Table V

## Navy/Marine Pipeline Assignment by Race

Pipeline	Black		White		X <sup>2</sup>
	N	%	N	%	
Navy					
Multi-engine	28	54.9	38	48.1	3.08 ns
Jet	11	21.6	28	35.4	
Helicopter	<u>12</u>	<u>23.5</u>	<u>13</u>	<u>16.5</u>	
Total:	51	100.0	79	100.0	
Marine					
Jet	4	26.7	13	39.4	.28 ns
Helicopter	<u>11</u>	<u>73.3</u>	<u>20</u>	<u>60.6</u>	
Total:	15	100.0	33	100.0	

between the white student naval aviators and the black student naval aviators in assignments to the various pipelines.

Table VI compares complete/attrite rates for the two groups by pipeline. Again, there were no statistically significant differences.

Tables VII - IX compare black students who attended predominantly black colleges with black students who attended white colleges on Aviation Selection Test scores, grade point averages, training variables, and pass/attrite. A list of colleges attended by the black students has been included in Appendix B.

The findings contained in Table VII indicate that black students from white colleges have significantly higher AQT scores than black students from black colleges while having significantly lower GPAs than black students from black colleges. One would have expected that the group having the higher AQT (i.e., white college) would also have the higher GPA. Again, the results should be interpreted with caution, since GPAs were compared without controlling for quality of college and college major. The necessary controls were not possible for lack of a sufficient number of subjects. No differences were found between the black students from white colleges and the black students from black colleges when comparing FAR scores.

Table VI  
Navy/Marine Attrition by Race and Pipeline

Pipeline	Black			White			$\chi^2$				
	Completed N	%	Attrited N	Total N	%	Attrited N		Total N			
Navy											
Multi-engine	17	60.7	11	39.3	28	21	55.3	17	44.7	38	.105 ns
Jet	7	63.6	4	36.4	11	22	78.6	6	21.4	28	.306 ns
Helicopter	10	83.3	2	16.7	12	12	92.3	1	7.7	13	.005 ns
Marine											
Jet	4	100.0	0	0.0	4	11	84.6	2	15.4	13	.903 ns
Helicopter	11	100.0	0	0.0	11	18	90.0	2	10.0	20	.103 ns

**Table VII**

**Means and Standard Deviations of Selection Test Scores and Grade Point Averages  
Among Black SNAs Graduating from Black Colleges and  
Black SNAs Graduating from White Colleges**

**CY73-76 Student Input**

Variable	Black College		White College		t
	N	Mean S.D.	N	Mean S.D.	
Academic Qualification Test	36	3.69 1.04	61	4.56 1.43	3.42**
Flight Aptitude Rating	36	4.81 1.37	61	4.89 1.69	.25
Grade Point Average	28	2.69 .41	52	2.44 .36	2.71**

**\*\***  $p < .01$

**Means and Standard Deviations of Training Grades of Blacks SNAs  
Graduating from Black Colleges and Black SNAs Graduating  
from White Colleges  
CY73-76 Student Input**

Grade	Black College			White College			t
	N	Mean	S.D.	N	Mean	S.D.	
Peer rating	19	46.90	12.95	23	47.11	15.19	.05
Officer-like Qualities (OLQ)	19	51.05	10.01	29	47.93	11.64	.99
Environmental Indoctrination	30	43.10	6.93	54	45.00	6.62	1.22
Final (EI)							
Basic Flight	22	3.00	.04	38	3.01	.04	.10
Basic Academic	22	43.59	7.08	38	47.12	7.84	1.79
Advanced Flight	18	3.03	.04	31	3.04	.03	.84
Advanced Academic	18	47.57	8.38	31	47.84	6.23	.12
Final Overall Grade	18	36.87	8.01	28	40.53	8.46	1.48

Table IX

CY73-76 Black Student Naval Aviator Attrition by  
College Racial Composition

College Racial Composition	Completed		Attrited		Total N
	N	%	N	%	
Black	18	50.0	18	50.0	36
White	31	50.8	30	49.2	61
Total:	49	50.5	48	49.5	97

$\chi^2 = .01$  (ns)

The results presented in Table VIII show no significant differences in training grades between black SNAs with a black college background (BCB) and black SNAs with a white college background (WCB). This is true even though black SNAs with WCB had higher AQTs than black SNAs with BCB.

Table IX presents black student completion/attrition rates from naval aviation training by college racial composition. Data on college racial composition were not available for two students. Only 37 percent of the black students for whom data were available attended predominantly black colleges. There was no statistically significant difference between the attrition rate of the black students who attended predominantly white colleges and the attrition rate of black students who attended predominantly black colleges.

#### SUMMARY

The first two reports in this four-part series of studies have shown no differences in attrition rates for black students and white students in naval aviation training when the groups are equated on AQT/FAR, procurement source, and class contiguity. Performance as measured by academic and flight grades, however, was significantly lower for the black students. In the present investigation three variables, college major, grade point average, and the college's racial composition were analyzed to determine the extent to which they could account for those performance differences.

The data analyses show:

- The two groups did not differ in the percentage distribution of college majors.

- Aviation training completion rates by college major varied between the two groups. Black students with majors in technical, engineering, social science, and physical science had the highest completion rates, while white students with majors in technical, business administration, physical education, and engineering had the highest completion rates.
- Grade point average was predictive of pre-advanced academic grades for black student naval aviators.
- Grade point average had no predictive validity for complete/attrite.
- Of the black SNAs, 63 percent attended predominantly white colleges.
- AQT scores were significantly higher for graduates of predominantly white colleges.
- Attrition rates did not differ as a function of college racial composition.

In addition, the two groups were compared by training pipelines. The results of this analysis show:

- No difference in input rates.
- No differences in complete/attrite rates.

## REFERENCES

1. Doll, R. E., and Baisden, A. G., A comparison of black civilian procured applicants and white civilian procured applicants for naval aviation training, CY 1976-1978. Special Report 79-3. Pensacola, Fl.: Naval Aerospace Medical Research Laboratory, May 1979.
2. Baisden, A. G., and Doll, R. E., A comparison of black student performance and white student performance in naval aviation training. Special Report 78-7 Pensacola, Fl.: Naval Aerospace Medical Research Laboratory, November 1978.

## **APPENDIX A**

**Black/White SNA Sample by Procurement Source and Year**



Black/White SNA Sample by Procurement Source and Year

	AOCs		AVROC		USNA		NROTC/OCS		USMC/USMCR		TOTAL	
	Black	White	Black	White	Black	White	Black	White	Black	White	Black	White
CY73	18	32	1	-*	-	-	-	2*	1	1	20	35
CY74	11	23	2	1	-	-	-	-	7	13	20	37
CY75	12	17	2	4	2	3	3	4	12	23	31	51
CY76	7	10	6	12	4	6	5	9	6	12	28	49

\* Imperfect match on one criteria.

**APPENDIX B**

**List of Colleges and Universities Attended by Black  
Students in Naval Aviation Training**

## **Traditionally and Predominantly White Universities**

Arkansas Central University  
Central University of Iowa  
City College of New York  
College of St. Mary  
College of the Holy Cross  
Colorado State University  
Culver-Stockton College  
Dartmouth College  
Duquesne University  
Florida State University  
Georgia Institute of Technology  
Georgia State University  
Jewish Theological Seminary of America  
Lake Superior State College  
Lawrence University  
Lewis-Clark State College  
Macalester College  
Marquette University  
Miami University  
Middle Tennessee State University  
Mississippi Valley State University  
New York Theological Seminary  
Northwestern University  
Pennsylvania State University  
Purdue University  
Southeast Missouri State University  
Southeastern Oklahoma State University  
Stanford University  
State College at Buffalo  
St. Mary's College  
St. Paul's College  
United States Naval Academy  
University of Georgia  
University of Maryland  
University of Michigan  
University of Nevada  
University of North Florida  
University of Pittsburgh  
University of Southern California  
Villanova University  
Western Kentucky University

## **Traditionally and Predominantly Black Colleges and Universities**

**Alabama A&M University  
Alabama State University  
Albany State College  
Benedict College  
Bethune - Cookman College  
Claflin College  
Clark College  
Dillard College  
Florida A&M University  
Fort Valley State College  
Grambling State University  
Morehouse College  
North Carolina A&T State University  
North Carolina Central University  
Prairie View A&M College  
Savannah State College  
South Carolina State College  
Southern University  
Tennessee State University  
Tuskegee Institute  
Voorhees College  
Winston-Salem State University**

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) <b>This report represents the third in a series of reports analyzing minority officer accessions and attritions as related to the Naval Air Training Program. Previous reports have shown no differences in attrition rates for black students and white students in pilot training when the two groups are equated on AQT/FAR, procurement source, and class contiguity. Performance, as measured by academic and flight grades, however, was significantly lower for the black students. In this report, three variables, college major, grade point average, and the college's racial composition were analyzed to determine the extent to which they could account for those performance differences. In addition, the two groups were compared by training pipelines.</b>		

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20. ABSTRACT (Continued)

The college majors of the black students were not significantly different from those of the matched group of white students. Black students with majors in technical, engineering, social science, and physical science had the highest aviation training completion rates, while white students with majors in technical, business administration, physical education, and engineering had the highest completion rates. Grade point average was predictive of pre-advanced academic grades for black students, but had no predictive validity for complete/attrite. The majority of black students attended predominantly white colleges. The AQT was significantly higher for black students who attended white colleges, but attrition rates did not differ. There were no differences in input or attrition rates when the black students and white students were compared by training pipelines.

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